

U.S. PATENT APPLICATION

ENTITLED:

APPARATUS FOR CONTROLLING A MICROTOME AND A
COOLING CHAMBER PROVIDED THEREFOR

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5 **APPARATUS FOR CONTROLLING A MICROTOME AND A COOLING**
 CHAMBER PROVIDED THEREFOR

CROSS REFERENCE TO RELATED APPLICATIONS

 This application claims priority of the German patent application 102
42 712.7 which is incorporated by reference herein.

10 **FIELD OF THE INVENTION**

 The present invention concerns an apparatus for controlling a
microtome and a cooling chamber provided therefor.

BACKGROUND OF THE INVENTION

 U.S. Pat. No. 6,178,757 describes a control apparatus for a cooling
15 chamber into which a microtome or ultramicrotome is placed. The control apparatus
encompasses a microcontroller to which a first and a second control circuit for the
sample and the knife are connected. An adjusting element is provided for adjusting
and also correspondingly monitoring the desired temperature for the knife and
sample.

20 Control of a system that comprises a microtome and a cooling chamber is described
in the brochure for the Leica Ultracut S/FCS. There are two separate control units for
the overall system. A first control unit is used for control purposes and for the input
of cutting parameters for the microtome. The second control device serves
exclusively for adjustment and temperature regulation of the cooling chamber around
25 the region of the knife and the sample holder. Since the space available on laboratory

- 5 benches is usually limited, a plurality of control units is not necessarily especially suitable.

In order to solve the problem of insufficient space, the RCM company proposes, in its company brochure, the variant of a small cooling chamber control unit. This control unit can be placed on the ultramicrotome control unit. Nevertheless, two separate
10 control units are still provided, and the power supply and power electronics for the cooling chamber control unit are additionally housed in a "black box." This additional black box need not be placed on the laboratory bench, since it contains no operating elements. An additional part of a system is created, however, which is not conducive to user-friendliness.

- 15 The Leica CM 3600 discloses a sectioning device for large biological tissues. There is a programmable logic unit controller provided which allows input of study related data. The Leica CM 3600 does not disclose two separate units which are controlled by one control device.

The Leica CM 3050 S shows a cryostat system which can produce slices at low
20 temperatures. The difference to the present invention is that the whole system is covered with a temperature shielding housing and the housing itself includes control buttons.

SUMMARY OF THE INVENTION

- It is therefore the object of the invention to create a unified, space-
25 saving, and user-friendly control system for a system made up of a microtome and a separate cooling chamber.

5 The object is achieved, according to the present invention, with an apparatus for controlling a microtome and a cooling chamber, which is positioned on the microtome, comprising:

a single control unit that integrates both operating elements for the microtome and operating elements for the cooling chamber; and

10 a single display is associated with the control unit, wherein the single display is, dependent from the specific configuration of microtome and cooling chamber, a user interface for the microtome and/or the cooling chamber.

The apparatus for controlling a microtome and a cooling chamber provided therefor has the critical advantage that a single control unit is provided that integrates both
15 operating elements for the microtome and operating elements for the cooling chamber. Associated with the control unit is a user interface that is embodied in the form of a display or screen. The operating elements can be presented to a user on the display. The control unit is configured in such a way that a cooling chamber connected to the microtome can be detected. The control unit modifies or adds to the
20 operating elements presented on the display in accordance with the operating elements for the cooling chamber.

It is particularly advantageous that the invention results not only in space reduction on a laboratory bench, but also in simpler handling for the user. It is likewise advantageous and conceivable for functions that are not often used to be presented
25 only in a submenu on the display. The result of this is that the control unit is arranged and/or organized better.

The power electronics and/or power supplies, which are not housed in this control unit, can be assigned to the devices (microtome or cooling chamber). A black box or an external power supply is also conceivable. It is furthermore advantageous that the
30 invention not only achieves the space reduction, but also makes possible a cost reduction. This is important principally for customers who do not originally possess a cooling chamber, since the control unit has cooling-chamber costs associated with it.

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BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be elucidated below with reference to the examples depicted schematically in the Figures, in which:

- FIG. 1 is a schematic side view of the microtome with a cooling chamber and control unit;
- 10 FIG. 2 is a schematic side view of another embodiment of the microtome with cooling chamber and control unit; and
- FIG. 3 schematically depicts a user interface for the shared control unit.

DETAILED DESCRIPTION OF THE INVENTION

- FIG. 1 is the a schematic side view of a microtome 2 that is equipped
- 15 with a cooling chamber 4. Although only the term "microtome" is used in the foregoing description and in the description to follow, this term is also, of course, understood to mean an ultramicrotome. In the depiction of FIGS. 1 and 2, cooling chamber 4 is marked with dashed lines. Microtome 2 possesses a sample holder 6 that is movable up and down. Also provided on the microtome is a knife holder 8 which is
- 20 arranged in such a way that it is located opposite a sample 10 mounted on sample holder 6. In the exemplary embodiment depicted in FIG. 1, a shared control unit 12 is provided. Control unit 12, microtome 2, and cooling chamber 4 are each connected using an electrical conductor 14. Associated with control unit 12 is a display 16 on which a user interface, for adjusting microtome 2 and cooling chamber 4, is
- 25 displayed. The user interface makes adjustment icons or buttons for microtome 2 and cooling chamber 4 available to the user. Since it often happens that customers first purchase microtome 2 and later opt for a cooling chamber 4, control unit 12 is designed so that it detects, for example, a cooling chamber that has just been

5 connected, and rearranges or adapts the user interface in accordance with the new configuration of the system. Operating elements that are connected to control unit 12 can assume various configurations. For example, they can be embodied as buttons, rotary encoders, or joysticks, and can have various functions. Also conceivable for display 16 is a touch screen on which, alongside the operating elements for
10 microtome 2, additional or different operating elements for cooling chamber 4 can be displayed. Actuation of the operating elements using external input devices such as a mouse, trackball, etc. is also possible.

FIG. 2 depicts a different exemplary embodiment of the invention. Identical reference characters are used for identical elements. Here control unit 12 is provided in
15 microtome 2, and is hereinafter labeled with the reference character 18. A detection device 20, which is connected to a control unit 18 via a conductor 22, is provided between microtome 2 and cooling chamber 4. Detection device 20 can be embodied as a plug connector, a transponder, a scanner, a barcode reader, etc. In the case of a scanner or barcode reader, a label or a barcode (not depicted) is advantageously
20 provided on cooling chamber 4. The label or barcode are applied on cooling chamber 4 in such a way that when a cooling chamber 4 is placed on a microtome 2, it is located opposite detection device 20. A trackball 24, for example, with which multiple actuation elements for microtome 2 and/or for cooling chamber 4 can be operated on display 16 by the user, is connected to control unit 18. Display 16 itself is
25 connected via a conductor 24 to control unit 18. A wireless connection between display 16 and control unit 18 is also conceivable.

FIG. 3 is a schematic depiction of a user interface for the shared control unit 12 or 18. The description below refers to the embodiment depicted in FIG. 3, but it is self-evident that this is not to be construed as a limitation. Multiple operating elements 30
30 for microtome 2, and multiple operating elements 32 for cooling chamber 4 if applicable, are displayed on display 16. FIG. 3 depicts the situation in which a cooling chamber 4 is connected to microtome 2. Control unit 12 or 18 detects the

5 cooling chamber, so that display 16 is divided by means of a software program into a
first part 16a and a second part 16b. Operating elements 32 for cooling chamber 4 are
displayed in first part 16a, and operating elements 30 for microtome 2 in second part
16b. Operating elements 32 for cooling chamber 4 can encompass, for example,
setpoint temperature, actual temperature, cooling rate, etc. Operating elements 30 for
10 microtome 2 can encompass, for example, cutting speed, sample feed, etc. Operating
elements 30 and 32 can be equipped with a pull-down menu 34 with which the user
can select defined parameter increments or also make user-defined inputs.